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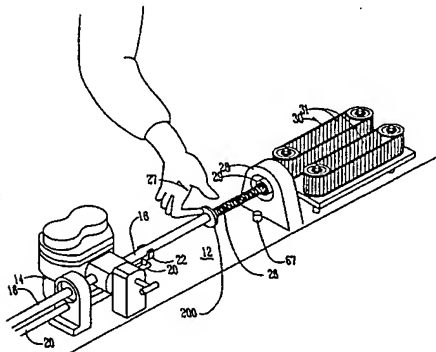
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(54) Title: METHOD AND MEANS FOR FILLING NATURAL CASING SAUSAGES

(57) Abstract

A method of filling a natural hollow elongated casing with meat emulsion involves placing a natural casing on an elongated meat emulsion stuffing tube having a meat emulsion discharge end, closing an extended end of the natural casing over the discharge end of the stuffing tube so that meat emulsion exiting the discharge end will push the natural casing longitudinally by pumping meat emulsion through the stuffing tube for expansive discharge into the natural casing at a sufficient volume and velocity to provide the primary energy within the natural casing to move the natural casing forwardly off of the discharge end of the stuffing tube. The casing is extended through a hollow chuck (100). A resilient brake element (160) in the chuck is extended around the casing to impede its longitudinal movement. A thrust collar (200) is slidably mounted on the stuffing tube and is intermittently manually pushed against the casing to limit the length thereof but is insufficient to create compression pressure thereon. An apparatus for filling a natural casing has a thrust collar on the stuffing horn (16) for pushing the natural casing longitudinally, and a casing hopper (46) that can be pivoted from a forward operating position to a rearward inoperative position.



TITLE: METHOD AND MEANS FOR FILLING NATURAL CASING SAUSAGES

BACKGROUND OF THE INVENTION

5 Sausages have been traditionally made by filling the natural intestines of sheep, for example, with the sausage meat product whereupon the filled natural casing was formed into links for cooking by the consumer. In more modern times, sausages are predominantly made by introducing a meat emulsion into an artificial casing which encased the sausage material through linking and preliminary cooking whereupon the casings are peeled from
10 the sausage before being sold to the consumer. Machines for making sausages with artificial casings have a high volume capability (up to 30,000 sausages per hour). Efforts have been made to use these high speed machines with natural casings. However, because of the nature of the natural casings including their relatively shorter length and non-uniform diameter, modern sausage encasing machines have not achieved the volume and
15 capacity with natural casings as they do with artificial casings.

It is therefore a principal object of this invention to provide a method and machine for filling natural casings which is economical, relatively fast, and easy to accomplish as compared to previous ways of filling natural casings.

A still further object of this invention is to provide a method and a machine for
20 filling natural casings wherein the meat pressure expands the natural casing and pushes the casing forward as the meat emulsion discharges from a conventional hollow stuffing horn.

A further object of this invention is to provide a machine and method for filling a natural casing wherein the filled casing passes through a hollow chuck with a resilient brake therein which impedes the movement of the casing from the stuffer tube and wherein
25 the resilient brake creates a balance between the meat pushing forward on the casing and the brake holding back on the casing, all to create the desired fill or plumpness of the resulting sausage.

A still further object of this invention is to provide a flexible or resilient brake in a hollow chuck through which the filled casing moves in a rotatable twisting head which not
30 only produces a longitudinal drag on the casing to resist forward motion thereof, but also

provides a radial rotating course which helps to rotate the casing and thereupon facilitate twisting thereof as the filled sausage casing moves through the linking chains.

A still further object of this invention is to provide a follower or thrust collar on the stuffing tube upstream of the natural casing which is manually and intermittently pushed against the back side of the natural casing which provides a light force to prevent the natural casing from sticking to the tube but does not serve to move the natural casing from the tube, for this is accomplished by the momentum of the meat emulsion filling the casing. This force is insufficient to cause squeezing pressure between the follower and the twisting head.

A still further object of this invention is to provide a method and machine which will permit easy conversion of the machine from the natural casing operation to the artificial casing operation.

A still further object of the invention is to provide a casing clamp and casing hopper on a sausage making machine which can be moved away from the casing filling station at times to accommodate the natural casing mode for the machine.

A still further object of the invention is to provide a method and apparatus for filling a natural casing which has the ability to change the stuffing tube from a full stroke as with artificial casings to a partial stroke for use with natural casings.

A still further object of the invention is to provide a method and machine for filling natural casings which has a thrust collar that can be manually controlled by the operator, or an automatic follower which will duplicate the manual operation by providing a series of intermittent push and release actions to move the unshirred casing forward.

A still further object of the invention is to provide a method and machine to fill natural casings wherein water is present at various stages of the operation to keep the natural casing from becoming dehydrated and to maintain its very soft, pliable and slippery character.

A still further object of the invention is to provide a method and machine for filling natural casings which utilizes a cooling turban as a part of the rotating twister.

These and other objects will be apparent to those skilled in the art.

SUMMARY OF THE INVENTION

A method of filling a natural hollow elongated casing with meat emulsion involves placing a natural casing on an elongated meat emulsion stuffing tube having a meat emulsion discharge end, closing an extended end of the natural casing over the discharge end of the stuffing tube so that meat emulsion exiting the discharge end will push the natural casing longitudinally by pumping meat emulsion through the stuffing tube for expansive discharge into the natural casing at a sufficient volume and velocity to provide the primary energy within the natural casing to move the natural casing forwardly off of the discharge end of the stuffing tube. The casing is extended through a hollow chuck. A resilient brake element in the chuck is extended around the casing to impede its longitudinal movement. A thrust collar is slidably mounted on the stuffing tube and is intermittently manually pushed against the casing to limit the length thereof but is insufficient to create compression pressure thereon.

An apparatus for filling meat emulsion into an elongated natural or artificial casing has (a) a casing filling station including a stuffing tube for supporting a casing to be filled with meat emulsion, (b) a casing hopper to serve as a reservoir for a plurality of shirred artificial casings mounted on the machine adjacent the casing filling station for delivery of shirred artificial casings for mounting on the stuffing tube, and (c) means on the machine for moving the casing hopper away from its position adjacent the casing filling station when natural casings are placed on a stuffing tube in the casing filling station.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a perspective view of a prior art sausage encasing machine which shows the general relationship of the major components of the sausage making machine of this invention;

Fig. 2 is an enlarged scale perspective view of the prior art machine of Fig. 1 taken on line 2-2 of Fig. 1;

Figs. 2A and 2B show the casing hopper of Fig. 2 in forward and rearward positions, respectively;

Fig. 3 is an enlarged scale perspective view of the machine of Fig. 2 using conventional shirred casings;

Figs. 3A and 3B are enlarged scale perspective views of the conventional components of a sausage encasing machine after the natural casing is placed on the stuffing horn;

Fig. 4 is an enlarged scale sectional view of the chuck; and

5 Fig. 5 is a view similar to Fig. 5 during the casing filling process.

DESCRIPTION OF THE PREFERRED EMBODIMENT

A sausage encasing machine 10 (Fig. 1) has a frame 12, and a conventional meat emulsion pump 14 connected to a source of meat emulsion. A stuffing horn 16 is slidably
10 and operably connected to the pump 14 and is longitudinally moveable by air piston 17 contained in housing 18 (Fig. 1). A follower rod 20 is also slidably mounted on the pump 14 parallel to horn 16 and has an actuator 22 on one end slidably mounted on horn 16. Follower rod 20 is powered by air piston 24 located in housing 18. An elongated shirred sausage casing 26 is convention-ally mounted on horn 16. The forward end of horn 16
15 conventionally terminates at casing filling station 27 (Fig. 3) adjacent twister housing 28 which has a hollow rotatable chuck 29 which receives a meat filled casing 26 and rotates it before the meat filled casing moves into conventional linker 30. (Fig. 4, 5). The chains 31 of linker 30 are rotated by a motor 34 through suitable shafts, gears or belts. The conventional chuck 120 (Figs. 4, 5) in housing 28 is rotated by a motor (not shown)
20 through suitable shafts and gears. Linker 30 is positioned within housing 36 (Fig. 1). The foregoing components are all conventional and are well known in the art, (see U.S. Patent No. 3,115,668) and are controlled by computer control 38 (Fig. 1).

The completed strand of sausages 40 exits the machine 10 through horn 42 and the strand is deposited on the chain of hooks of conventional conveyor 44 (Fig. 1).

25 A casing hopper 46 has tapered sidewalls 48 and a sloping bottom 50 (Fig. 2) which cause shirred casings 26 therein to migrate downwardly towards a bottom opening 52. Hopper 46 is pivoted at 54 (Fig. 2) to any convenient side supports 56. It is also mounted on plate 58 which is pivotally mounted on plate 60 on a vertical axis of pin 61 to be rotated from the forward aperture position of Fig. 2A for filling shirred casings to an inoperative
30 rearward position of Fig. 2B when not in use. A removable lock pin 62 extends between plates 58 and 60 to selectively lock hopper 46 in a forward or rearward position. A PLC 66

is mounted on machine 10 to program and coordinate the components of the machine. The PLC will control the pump 14, the rotation and longitudinal movement of horn 16, the position of hopper 46, and the operation of chuck 120, linker 30 and conveyor 44. A sensor or stop 67 (Figs. 3-5) adjacent the twister 28 will cause the functions at the filling station 27 to cease when the casing 220 is filled.

A rotatable chuck 100 (Figs. 5 and 6) has a cylindrical body portion 120 with a longitudinal center bore 140. A resilient brake element 160 is deposited within the center portion of bore 140. The brake 160 has a center bore 180 through which the stuffing horn 16 extends with a natural casing 220 thereon. The brake 160 provides a longitudinal drag on the natural casing as described heretofore. The location of the brake 160 in the chuck 100 can vary from one end to the other. It can be integral with the cylindrical housing 120, or can be of a separate material that is affixed in any convenient manner to the interior center bore of the chuck. The friction applied to the natural casing by the brake 160 merely impedes the free flow of the natural casing from the surface of the stuffing tube, but is insufficient to prevent the movement of the natural casing from the stuffing tube provided by the energy of the meat emulsion discharged from the stuffing tube into the interior of the natural casing.

When it is desired to change the machine 10 from filling conventional shirred casings to the filling of natural casings, the lock pin 62 is released and the hopper 46 is rotated about pin 61 from the forward position of Fig. 2B to the inoperative position of Fig. 2A so that it is out of the way for the process of filling natural casings. The thrust collar 200 is slidably mounted on the stuffing tube 16 (Figs. 3 and 4) behind the natural casing 220. The collar 200 is intermittently manually or automatically pushed against the casing insufficiently to create squeezing or compression pressure thereon but to facilitate the normal forward movement of the casing on the stuffing tube beyond the normal movement of the casing caused by the energy of the emulsion entering the casing. The longitudinal displacement of tube 16 is typically shortened by the PLC 66 when natural casings are being filled. The hopper 46 can be mechanically lifted, hinged, or moved by sliding to move out of the way to facilitate the process for filling the natural casings.

It is therefore seen that this machine will achieve at least all of its stated objectives.

What is claimed:

1. A method for filling a natural hollow elongated casing with a meat emulsion, comprising, placing a natural casing on an elongated meat emulsion stuffing tube having a meat emulsion discharge end, closing an extended end of the natural casing over the
5 discharge end of the stuffing tube so that meat emulsion exiting the discharge end will push the natural casing longitudinally by pumping meat emulsion through the stuffing tube for expansive discharge into the natural casing at a sufficient volume and velocity to provide the primary energy within the natural casing to move the natural casing forwardly off of the discharge end of the stuffing tube.
- 10 2. The method of claim 1 wherein water is applied to the natural casing before placing the casing on the stuffing tube to make the casing hydrated, soft, pliable and slippery to prevent adhesion of the casing to the stuffing tube.
- 15 3. The method of claim 1 wherein the forward end of the stuffing tube extends through a hollow chuck, placing a resilient brake element in the chuck around the stuffing tube to yieldingly engage the natural casing to impede the longitudinal movement of the natural casing on the stuffing tube.
- 20 4. The method of claim 1 wherein a rotatable linking assembly is located downstream of the discharge end of the stuffing tube to link the natural casing filled with the meat emulsion and to impede the longitudinal movement of natural casing from the stuffing tube.
- 25 5. The method of claim 1 wherein a meat pump is employed to pump meat emulsion through the stuffing tube, wherein the forward end of the stuffing tube extends through a hollow chuck, placing a resilient brake element in the chuck around the stuffing tube to yieldingly engage the natural casing to impede the longitudinal movement of the natural casing on the stuffing tube, wherein a rotatable linking assembly is located downstream of
30 the discharge end of the stuffing tube to link the natural casing filled with the meat

emulsion and to impede the longitudinal movement of natural casing from the stuffing tube.

6. The method of claim 1 wherein a thrust collar is slidably mounted on the stuffing tube behind the natural casing, intermittently pushing the thrust collar against the casing insufficiently to create squeezing or compression pressure thereon but to facilitate the normal forward movement of the casing on the stuffing tube beyond the normal movement of the casing caused by the energy of the emulsion entering the casing.
7. A method for filling a natural hollow elongated casing with a meat emulsion, comprising, providing a casing filling station including a stuffing tube for supporting the casing to be filled with meat emulsion, providing a casing hopper adjacent the casing filling station to serve as a reservoir for a plurality of shirred artificial casings for delivery of shirred artificial casings for mounting on the stuffing tube, and moving the casing hopper away from its position adjacent the casing filling station when natural casings are placed on a stuffing tube in the casing filling station.
8. The method of claim 7 wherein a PLC is provided and senses when the casing hopper is in its position adjacent the casing filling station to thereupon control the longitudinal movement of the stuffing tube, to maintain the stuffing tube in a non-automatic extension mode, to hold a follower connected to the stuffing tube in a retracted position, and to maintain the casing hopper in its position adjacent the casing filling station.
9. The method of claim 7 wherein a natural casing is placed on the stuffing tube with the stuffing tube being in a partially retracted position to locate a discharge end of the stuffing tube upstream of the casing filling station; actuating the PLC to cause the stuffing tube to extend through a chuck, and to cause a meat pump to start pumping meat through the stuffing tube when the position of the stuffing tube through the chuck is sensed, and to start the rotation of the chuck and the stuffing tube, and to start the operation of linking chains and a conveyor located downstream from the casing filling station; manually

advancing the follower and sensing its arrival at a position adjacent a twister mechanism containing the chuck, and causing the PLC to stop the operation of the casing filling station.

5 10. A machine for filling meat emulsion into elongated natural or artificial casings, comprising, a casing filling station including a stuffing tube for supporting a casing to be filled with meat emulsion, a casing hopper to serve as a reservoir for a plurality of shirred artificial casings mounted on the machine adjacent the casing filling station for delivery of shirred artificial casings for mounting on the stuffing tube, and means on the machine for
10 moving the casing hopper away from its position adjacent the casing filling station when natural casings are placed on a stuffing tube in the casing filling station.

11. The machine of claim 10 wherein the means for moving the casing hopper includes means for pivoting the casing hopper away from the casing filling station.

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12. The machine of claim 10 wherein the means for moving the casing hopper includes means for raising the casing hopper, pivoting the casing hopper, and thence lowering the casing hopper for moving the casing hopper away from the casing filling station.

20 13. The machine of claim 10 wherein the stuffing tube is longitudinally movably mounted on the machine, and means is associated with the stuffing tube to permit adjustment of its longitudinal movement.

14. The machine of claim 10 wherein the adjustment of the longitudinal movement of
25 the stuffing tube is comprised of a removable hard stop, or a sensor actuated pneumatic control means.

15. The machine of claim 10 wherein at least one sensor is located in the machine to detect when the casing hopper is in its position adjacent the casing filling station; the
30 sensor being operatively connected to a PLC to control longitudinal movement of the stuffing tube and to maintain the stuffing tube in a non-automatic extension mode, to hold

a follower connected to the stuffing tube in a retracted position, and to maintain the casing hopper in its position adjacent the casing filling station.

16. The machine of claim 15 wherein a natural casing is placed on the stuffing tube with the stuffing tube in a partially retracted position and with a discharge end being upstream of the casing filling station; the PLC upon being actuated is adapted to cause the stuffing tube to extend through a chuck, and to cause a meat pump to start pumping meat through the stuffing tube when the position of the stuffing tube through the chuck is sensed, and to start the rotation of the chuck and the stuffing tube, and to start the operation of linking chains and a conveyor located downstream from the casing filling station; a sensor on the machine adjacent a twister mechanism containing the chuck to detect the manual advancement of the follower in the proximity of the sensor to send a signal to the PLC to stop the operation of the casing filling station.

17. A sausage machine for filling natural casings which has a meat stuffing horn for receiving a hollow natural casing with a thrust collar slidably mounted on the stuffing tube for pushing a natural casing longitudinally on the stuffing tube.

18. The method of claim 6 wherein the thrust collar is intermittently manually pushed against the casing.

19. The machine of claim 10 wherein the means for moving the casing hopper includes means for horizontally pivoting the casing hopper away from the casing filling station.

20. The machine of claim 10 wherein the means for moving the casing hopper includes means for slidably moving the casing hopper away from the casing filling station.

21. The machine of claim 10 wherein the means for moving the casing hopper includes means for pivoting the casing hopper 180° away from the casing filling station.

AMENDED CLAIMS

[received by the International Bureau on 25 July 2000 (25.07.00);
original claims 1,6,9 and 18 amended ; new claims 22-24 added;
remaining claims unchanged (7 pages)]

1. A method for filling a natural hollow elongated casing with a meat emulsion, comprising, placing a natural casing on an elongated meat emulsion stuffing tube having a meat emulsion discharge end, closing an extended end of the natural casing over the
5 discharge end of the stuffing tube so that meat emulsion exiting the discharge end will push the natural casing longitudinally by pumping meat emulsion through the stuffing tube for expansive discharge into the natural casing at a sufficient volume and velocity to provide the primary energy within the natural casing to move the natural casing forwardly off of the discharge end of the stuffing tube, slidably mounting a thrust collar on the stuffing tube
10 behind the natural casing, and intermittently pushing the thrust collar against the casing insufficiently to create squeezing or compression pressure thereon but to facilitate the normal forward movement of the casing on the stuffing tube beyond the normal movement of the casing caused by the energy of the emulsion entering the casing.
- 15 2. The method of claim 1 wherein water is applied to the natural casing before placing the casing on the stuffing tube to make the casing hydrated, soft, pliable and slippery to prevent adhesion of the casing to the stuffing tube.
- 20 3. The method of claim 1 wherein the forward end of the stuffing tube extends through a hollow chuck, placing a resilient brake element in the chuck around the stuffing tube to yieldingly engage the natural casing to impede the longitudinal movement of the natural casing on the stuffing tube.
- 25 4. The method of claim 1 wherein a rotatable linking assembly is located downstream of the discharge end of the stuffing tube to link the natural casing filled with the meat emulsion and to impede the longitudinal movement of natural casing from the stuffing tube.
- 30 5. The method of claim 1 wherein a meat pump is employed to pump meat emulsion through the stuffing tube, wherein the forward end of the stuffing tube extends through a hollow chuck, placing a resilient brake element in the chuck around the stuffing tube to

yieldingly engage the natural casing to impede the longitudinal movement of the natural casing on the stuffing tube, wherein a rotatable linking assembly is located downstream of the discharge end of the stuffing tube to link the natural casing filled with the meat

emulsion and to impede the longitudinal movement of natural casing from the stuffing tube.

6. The method of claim 22 wherein a thrust collar is slidably mounted on the stuffing tube behind the natural casing, intermittently pushing the thrust collar against the casing insufficiently to create squeezing or compression pressure thereon but to facilitate the normal forward movement of the casing on the stuffing tube beyond the normal movement of the casing caused by the energy of the emulsion entering the casing.
7. A method for filling a natural hollow elongated casing with a meat emulsion, comprising, providing a casing filling station including a stuffing tube for supporting the casing to be filled with meat emulsion, providing a casing hopper adjacent the casing filling station to serve as a reservoir for a plurality of shirred artificial casings for delivery of shirred artificial casings for mounting on the stuffing tube, and moving the casing hopper away from its position adjacent the casing filling station when natural casings are placed on a stuffing tube in the casing filling station.
8. The method of claim 7 wherein a PLC is provided and senses when the casing hopper is in its position adjacent the casing filling station to thereupon control the longitudinal movement of the stuffing tube, to maintain the stuffing tube in a non-automatic extension mode, to hold a follower connected to the stuffing tube in a retracted position, and to maintain the casing hopper in its position adjacent the casing filling station.
9. The method of claim 8 wherein a natural casing is placed on the stuffing tube with the stuffing tube being in a partially retracted position to locate a discharge end of the stuffing tube upstream of the casing filling station; actuating the PLC to cause the stuffing tube to extend through a chuck, and to cause a meat pump to start pumping meat through the stuffing tube when the position of the stuffing tube through the chuck is sensed, and to start the rotation of the chuck and the stuffing tube, and to start the operation of linking chains and a conveyor located downstream from the casing filling station; manually

advancing the follower and sensing its arrival at a position adjacent a twister mechanism containing the chuck, and causing the PLC to stop the operation of the casing filling station.

- 5 10. A machine for filling meat emulsion into elongated natural or artificial casings, comprising, a casing filling station including a stuffing tube for supporting a casing to be filled with meat emulsion, a casing hopper to serve as a reservoir for a plurality of shirred artificial casings mounted on the machine adjacent the casing filling station for delivery of shirred artificial casings for mounting on the stuffing tube, and means on the machine for
10 moving the casing hopper away from its position adjacent the casing filling station when natural casings are placed on a stuffing tube in the casing filling station.
11. The machine of claim 10 wherein the means for moving the casing hopper includes means for pivoting the casing hopper away from the casing filling station.
- 15 12. The machine of claim 10 wherein the means for moving the casing hopper includes means for raising the casing hopper, pivoting the casing hopper, and thence lowering the casing hopper for moving the casing hopper away from the casing filling station.
- 20 13. The machine of claim 10 wherein the stuffing tube is longitudinally movably mounted on the machine, and means is associated with the stuffing tube to permit adjustment of its longitudinal movement.
14. The machine of claim 10 wherein the adjustment of the longitudinal movement of
25 the stuffing tube is comprised of a removable hard stop, or a sensor actuated pneumatic control means.
15. The machine of claim 10 wherein at least one sensor is located in the machine to detect when the casing hopper is in its position adjacent the casing filling station; the
30 sensor being operatively connected to a PLC to control longitudinal movement of the stuffing tube and to maintain the stuffing tube in a non-automatic extension mode, to hold

a follower connected to the stuffing tube in a retracted position, and to maintain the casing hopper in its position adjacent the casing filling station.

16. The machine of claim 15 wherein a natural casing is placed on the stuffing tube with the stuffing tube in a partially retracted position and with a discharge end being upstream of the casing filling station; the PLC upon being actuated is adapted to cause the stuffing tube to extend through a chuck, and to cause a meat pump to start pumping meat through the stuffing tube when the position of the stuffing tube through the chuck is sensed, and to start the rotation of the chuck and the stuffing tube, and to start the operation of linking chains and a conveyor located downstream from the casing filling station; a sensor on the machine adjacent a twister mechanism containing the chuck to detect the manual advancement of the follower in the proximity of the sensor to send a signal to the PLC to stop the operation of the casing filling station.

17. A sausage machine for filling natural casings which has a meat stuffing horn for receiving a hollow natural casing with a thrust collar slidably mounted on the stuffing tube for pushing a natural casing longitudinally on the stuffing tube.

18. The method of claim 1 wherein the thrust collar is intermittently manually pushed against the casing.

19. The machine of claim 10 wherein the means for moving the casing hopper includes means for horizontally pivoting the casing hopper away from the casing filling station.

20. The machine of claim 10 wherein the means for moving the casing hopper includes means for slidably moving the casing hopper away from the casing filling station.

21. The machine of claim 10 wherein the means for moving the casing hopper includes means for pivoting the casing hopper 180° away from the casing filling station.

22. A method for filling a natural hollow elongated casing with a meat emulsion, comprising, placing a natural casing on an elongated meat emulsion stuffing tube having a meat emulsion discharge end, closing an extended end of the natural casing over the discharge end of the stuffing tube so that meat emulsion exiting the discharge end will push
5 the natural casing longitudinally by pumping meat emulsion through the stuffing tube for expansive discharge into the natural casing at a sufficient volume and velocity to provide the primary energy within the natural casing to move the natural casing forwardly off of the discharge end of the stuffing tube, wherein the forward end of the stuffing tube extends through a hollow chuck, and placing a resilient brake element in the chuck around the
10 stuffing tube to yieldingly engage the natural casing to impede the longitudinal movement of the natural casing on the stuffing tube.

23. A machine for filling meat emulsion into elongated natural or artificial casings, comprising, a casing filling station including a stuffing tube for supporting a casing to be
15 filled with meat emulsion, a casing hopper to serve as a reservoir for a plurality of shirred artificial casings mounted on the machine adjacent the casing filling station for delivery of shirred artificial casings for mounting on the stuffing tube, means on the machine for moving the casing hopper away from its position adjacent the casing filling station when natural casings are placed on a stuffing tube in the casing filling station, wherein the
20 forward end of the stuffing tube extends through a hollow chuck, and a resilient brake element in the chuck around the stuffing tube to yieldingly engage the natural casing to impede the longitudinal movement of the natural casing on the stuffing tube.

24. A machine for filling meat emulsion into elongated natural or artificial casings, comprising, a casing filling station including a stuffing tube for supporting a casing to be
25 filled with meat emulsion, a casing hopper to serve as a reservoir for a plurality of shirred artificial casings mounted on the machine adjacent the casing filling station for delivery of shirred artificial casings for mounting on the stuffing tube, means on the machine for moving the casing hopper away from its position adjacent the casing filling station when
30 natural casings are placed on a stuffing tube in the casing filling station, and a thrust collar slidably mounted on the stuffing tube behind the natural casing for intermittent pushing against the casing insufficiently to create squeezing or compression pressure thereon but to

facilitate the normal forward movement of the casing on the stuffing tube beyond the normal movement of the casing caused by the energy of the emulsion entering the casing.

INTERNATIONAL SEARCH REPORT

International Application No.
PCT/US 00/02028

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 A22C11/02

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 A22C

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 830 050 A (KASAI MINORU ET AL) 3 November 1998 (1998-11-03)	1,3-5, 7-14
Y	column 3, line 7 -column 6, line 9; claims 1,22; figures 1,2,6,16,22,23	2,6,17
Y	US 3 952 370 A (GREIDER CHARLES AUSTIN) 27 April 1976 (1976-04-27) abstract; figures	2
Y	US 5 087 463 A (RAUDYS VYTAS A ET AL) 11 February 1992 (1992-02-11) column 2, line 23 -column 3, line 24 column 4, line 56 -column 5, line 66; figures 4-6	6,17
	-/-	

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents:

- *A* document defining the general state of the art which is not considered to be of particular relevance
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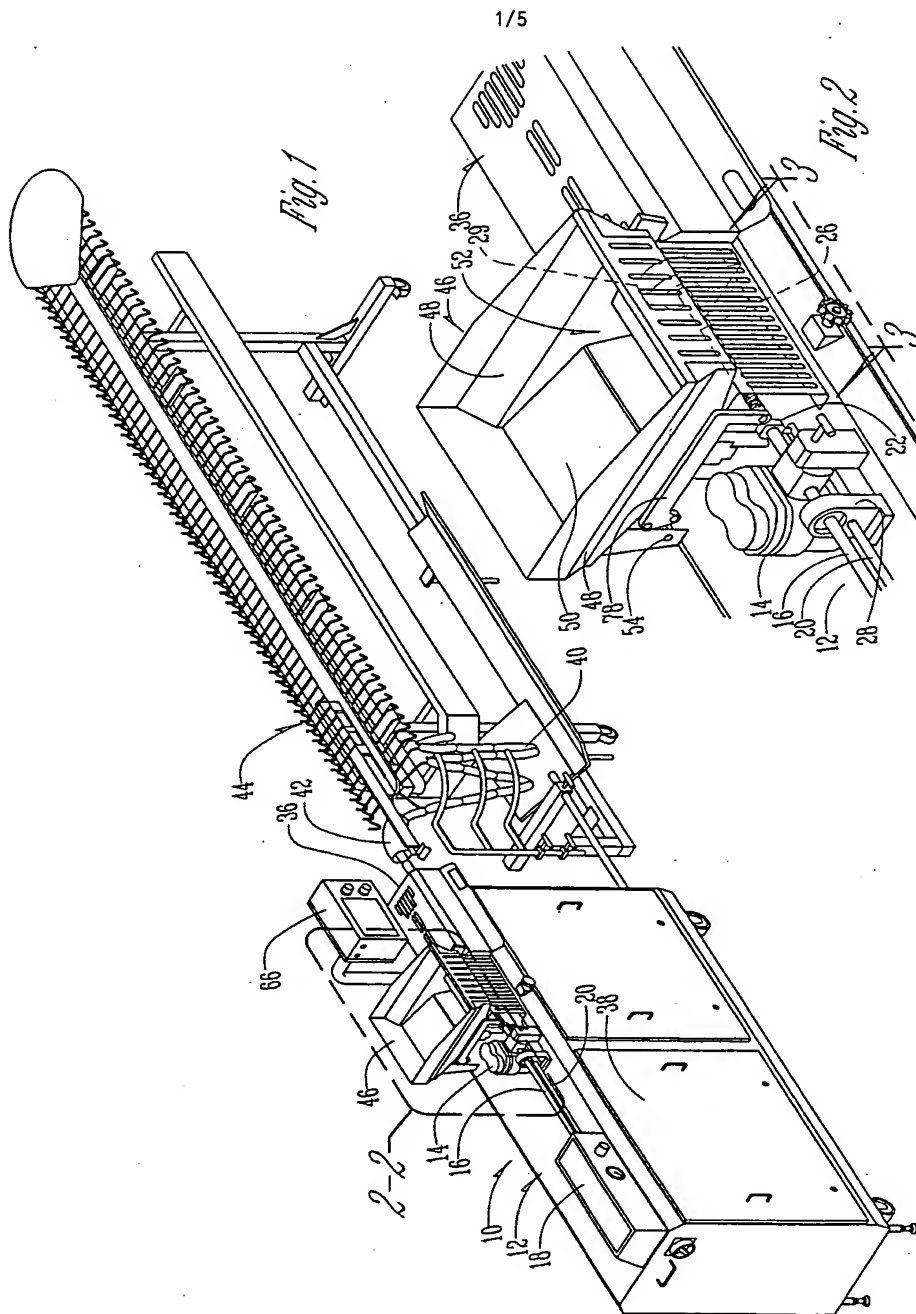
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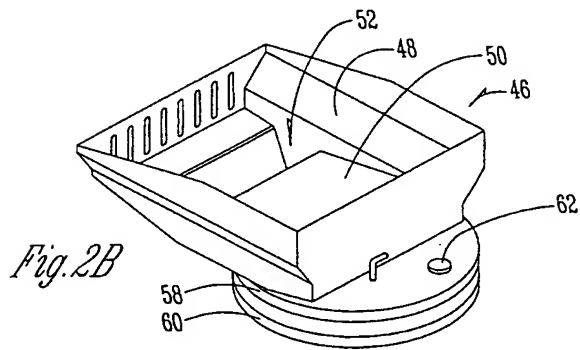
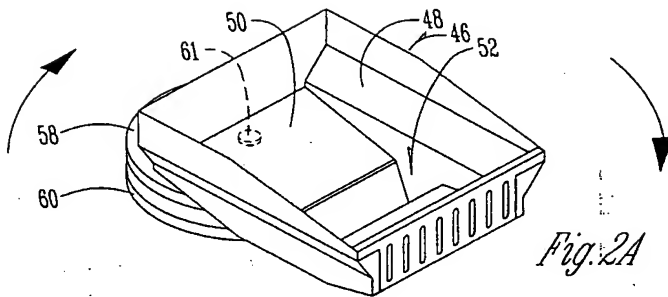
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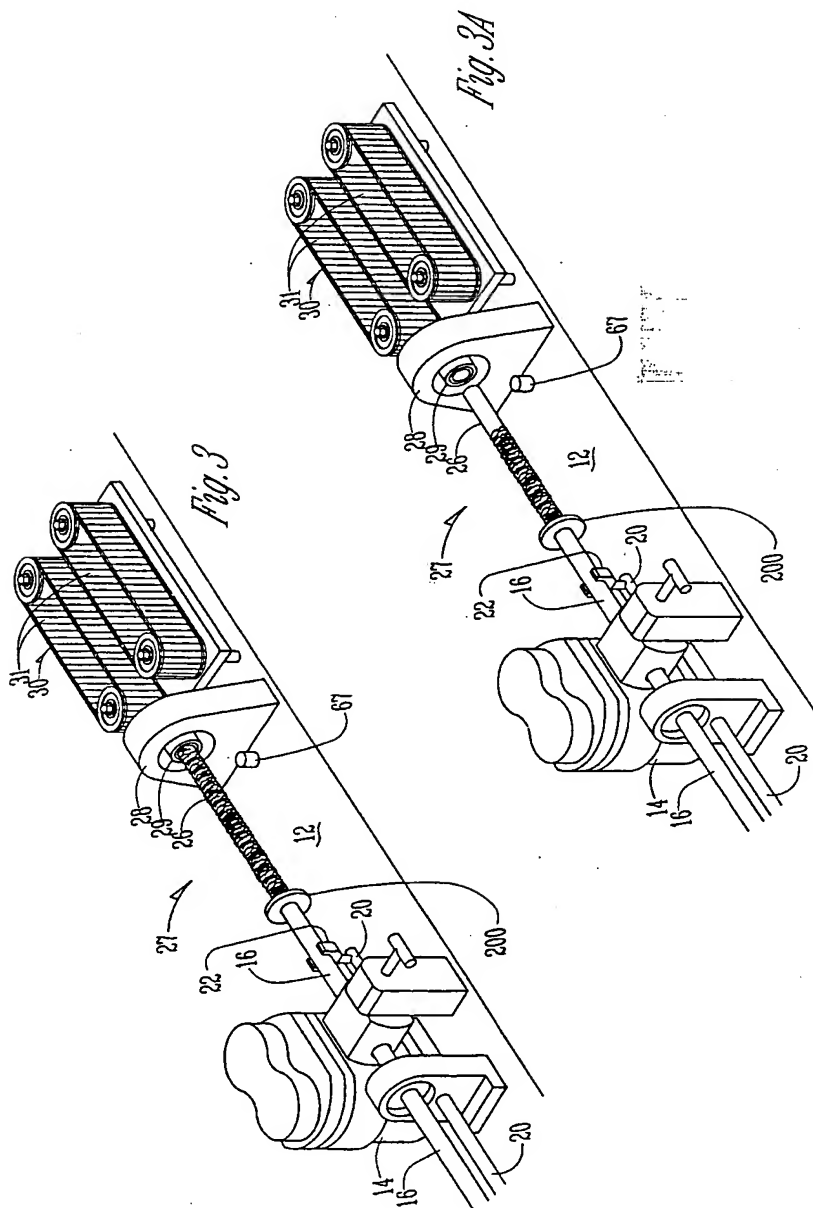
International Application No.
PCT/US 00/02028

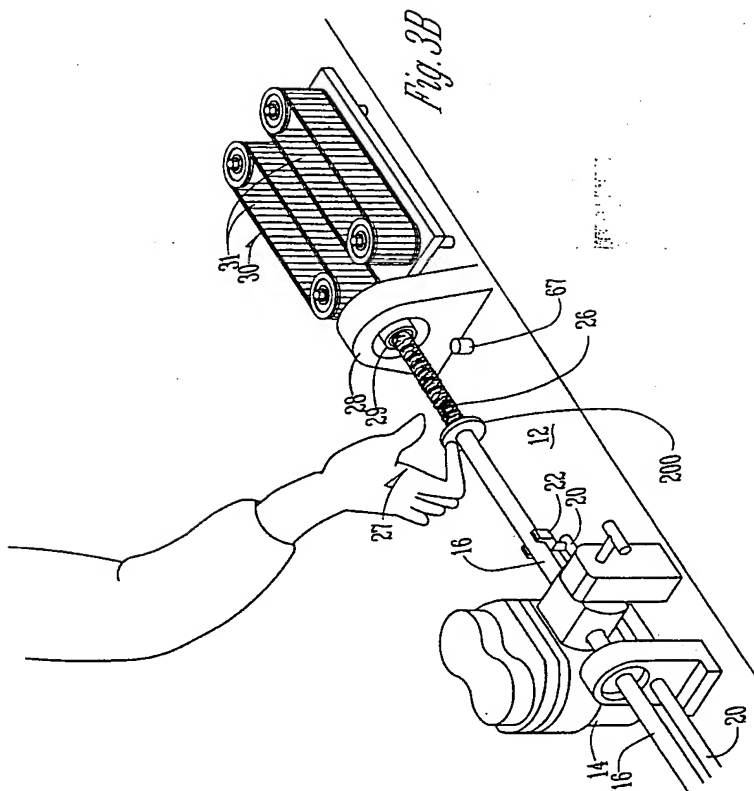
C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	EP 0 885 565 A (HANDTMANN ALBERT MASCHF) 23 December 1998 (1998-12-23) column 2, line 5 - line 10; claims; figures	1,3-5, 7-9
Y	US 5 813 907 A (LEBSACK KENNETH L ET AL) 29 September 1998 (1998-09-29) column 1, line 36 - line 64; figures 1,2	1,3-5, 7-9
A	EP 0 391 490 A (HITEC CO LTD) 10 October 1990 (1990-10-10) the whole document	10-21
A	US 3 672 001 A (GREIDER CHARLES AUSTIN) 27 June 1972 (1972-06-27) the whole document	10-16



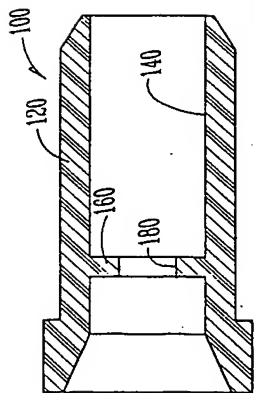
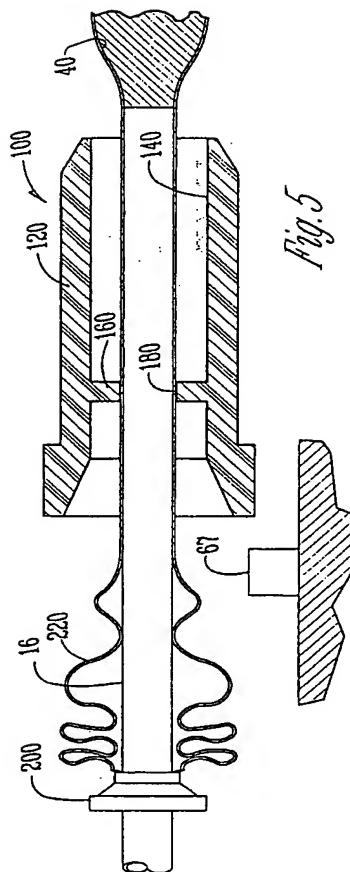
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*Fig. 4**Fig. 5*

INTERNATIONAL SEARCH REPORT

information on patent family members

Inter. Application No

PCT/US 00/02028

Patent document cited in search report		Publication date	Patent family member(s)		Publication date
US 5830050	A	03-11-1998	JP 8103206	A	23-04-1996
US 3952370	A	27-04-1976	NONE		
US 5087463	A	11-02-1992	NONE		
EP 0885565	A	23-12-1998	DE 19726238	C	14-01-1999
			US 5947809	A	07-09-1999
US 5813907	A	29-09-1998	NONE		
EP 0391490	A	10-10-1990	JP 2269618	A	05-11-1990
			JP 2747514	B	06-05-1998
			DE 69014955	D	26-01-1995
			DE 69014955	T	22-06-1995
			ES 2065467	T	16-02-1995
			US 5092814	A	03-03-1992
US 3672001	A	27-06-1972	NONE		

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